**Unit 1: Linear Systems**

**Warm-up Questions**

1. Translate each phrase into an algebraic expression
   1. Twice a distance
   2. Ten percent of a price
   3. Triple a length
2. Pickle Lake minor hockey charges a $150 initial fee to join the club and a $20 monthly fee. Central Patricia charges an initial fee of $100 and $30 per month.
   1. Write an equation to represent the cost of membership for Pickle Lake Minor Hockey.
   2. Write an equation to represent the cost of membership for Central Patricia.

**Lesson 2: The Method of Substitution**

Example 1: Solve Using Method of Substitution

The lines y = - x + 8 and x – y = 4 intersect at right angles. Find the coordinates of the point of intersection.

**Solution**

**Label equations 1 and 2**

**Y = - x + 8 (1)  
x – y = 4 (2)**

**Step 1: Equation 1 is y = - x + 8 so you can substitute –x + 8 in equation 2 for y**

**x – y = 4**

**x – (-x + 8) = 4**

**x + x – 8 = 4**

**2x – 8 = 4**

**2x = 12**

**X = 6**

**Step 2: Substitute x = 6 into equation 1 to find the corresponding value for y**

**Y = -x + 8**

**Y = - (6) + 8**

**Y = 2**

**Therefore the point of intersection is (6, 2).**

Example 2: Solve Using the Method of Substitution

Find the solution to the linear system

X + y = 5

3x – y = 7

**Solution**

**Step 1: Label the equations 1 and 2**

**X + y = 5 (1)**

**3x – y = 7 (2)**

**Step 2: Rearrange equation 1 to obtain an expression for y**

**Y = 5 – x (1)**

**3x – y = 7 (2)**

**Step 3: substitute 5 – x into equation 2 to find y**

**3x – (5 – x) = 7**

**3x – 5 + x = 7**

**4x – 5 = 7**

**4x = 12**

**X = 3**

**Step 4: Substitute x = 3 into equation 1 to find corresponding value for y.**

**X + y = 5**

**3 + y = 5**

**Y = 5 – 3**

**Y = 2**

**Therefore the solution is x = 3, y = 2**